



Image

1645

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Attorney Docket Number 2000.605 US PD

In re Application of:
JACOBS ET AL

Serial No.: 10/034,500

Group Art Unit: 1645

Filed: December 20, 2001

Examiner: P. Baskar

For: LAWSONIA INTRACELLULARIS VACCINE

SUBMISSION OF SEQUENCE LISTING

Commissioner of Patents
Alexandria, VA 22313

November 11, 2003

Sir:

Applicants are submitting herewith the Sequence Listing for the above-identified application both in paper copy form and in computer readable form. A paper copy of the Sequence Listing was also submitted October 29, 2003 in response to the Office Action of April 29, 2003. No new matter is added hereby.

The name of the file on the computer readable form is 2000605SEQLIST.ST25. The paper copy and the computer readable form are the same. No new matter is added hereby.

Please replace the current sequence listing in the specification with the instant sequence listing.

Respectfully submitted,
William P. Ray Reg. No. 44,295

for William M. Blackstone
William M. Blackstone
Attorney for Applicants
Registration No. 29,772

Akzo Nobel Patent Department
Intervet Inc. Patent Department
405 State Street
P.O. Box 318
Millsboro, DE 19966
Tel: (410) 464-0581
Sec: (302) 933-4027
Fax: (302) 934-4305



2000.605
10/034,500

Certificate of Mailing under 37 CFR 1.8

I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to:

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

on 11/12/03
Date


Signature

Katrina Mears

Typed or printed name of person signing Certificate

Note: Each paper must have its own certificate of mailing, or this certificate must identify each submitted paper.

*Submission of Sequence Listing (1 pg)
Paper copy (14 pages)
CRF (1 disk)
Postcard*

This collection of information is required by 37 CFR 1.8. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1.8 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P. O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.



2000605SEQLIST.ST25
SEQUENCE LISTING

<110> Akzo Nobel Patent Department
<120> Lawsonia Intracellularis Vaccine
<130> 2000.605
<140> 10/034,500
<141> 2001-12-20
<160> 32
<170> PatentIn version 3.2
<210> 1
<211> 656
<212> DNA
<213> Lawsonia intracellularis

<220>
<221> CDS
<222> (1)..(654)

<400> 1
gct gag gtg acg gcg agt tgt act aaa cgt gtt gaa agc tat aat tat 48
Ala Glu Val Thr Ala Ser Cys Thr Lys Arg Val Glu Ser Tyr Asn Tyr
1 5 10 15

ctt gtg gat tat tca ggc tct atg atg atg aaa cat gtt gct gtt aga 96
Leu Val Asp Tyr Ser Gly Ser Met Met Met Lys His Val Ala Val Arg
20 25 30

gag cct aaa ata gaa tta gca aaa gaa gct ata tta aaa att aat gcg 144
Glu Pro Lys Ile Glu Leu Ala Lys Glu Ala Ile Leu Lys Ile Asn Ala
35 40 45

gca atg cct aaa atg tca tat caa ggt gga tta tat act ttt gca cct 192
Ala Met Pro Lys Met Ser Tyr Gln Gly Gly Leu Tyr Thr Phe Ala Pro
50 55 60

tat tct gta att att ccc caa ggt tct tgg aat tca tgt gtt gcc gaa 240
Tyr Ser Val Ile Ile Pro Gln Gly Ser Trp Asn Ser Cys Val Ala Glu
65 70 75 80

tgt gcg gtt aat aca att aag tct gat tta gaa att ttt ggt cgt ctt 288
Cys Ala Val Asn Thr Ile Lys Ser Asp Leu Glu Ile Phe Gly Arg Leu
85 90 95

act cct gtg gga gac ggc ata aaa atg cat gaa aca gtc att aat caa 336
Thr Pro Val Gly Asp Gly Ile Lys Met His Glu Thr Val Ile Asn Gln
100 105 110

atg ccc cct cag gca gcc gtt att ctt ctc act gat ggt cat aat aat 384
Met Pro Pro Gln Ala Ala Val Ile Leu Leu Thr Asp Gly His Asn Asn
115 120 125

2000605SEQLIST.ST25

tta ggg atg aat cct gtt gag gaa gta aaa tct ata tat caa aca aat	432
Leu Gly Met Asn Pro Val Glu Glu Val Lys Ser Ile Tyr Gln Thr Asn	
130 135 140	
cct aat gtt tgt ttt cat gta gtt tca ttt gca gat gat gct gaa ggc	480
Pro Asn Val Cys Phe His Val Val Ser Phe Ala Asp Asp Ala Glu Gly	
145 150 155 160	
aaa gca ata att gat caa att gtt gca ctt aat agt gga agt gtt ctt	528
Lys Ala Ile Ile Asp Gln Ile Val Ala Leu Asn Ser Gly Ser Val Leu	
165 170 175	
gtt gat ggt tta cag ctt cta caa aat cct gct gtt tgc caa gaa ttt	576
Val Asp Gly Leu Gln Leu Gln Asn Pro Ala Val Cys Gln Glu Phe	
180 185 190	
gtt aat agt gtt ttt tgt caa gag caa att ctt gtt aca gaa gaa gtt	624
Val Asn Ser Val Phe Cys Gln Glu Gln Ile Leu Val Thr Glu Glu Val	
195 200 205	
gtt gta ctt cgt ggc gtc aac ttt gcc ttc ga	656
Val Val Leu Arg Gly Val Asn Phe Ala Phe	
210 215	

<210> 2
<211> 218
<212> PRT
<213> *Lawsonia intracellularis*

<400> 2

Ala Glu Val Thr Ala Ser Cys Thr Lys Arg Val Glu Ser Tyr Asn Tyr
1 5 10 15

Leu Val Asp Tyr Ser Gly Ser Met Met Met Lys His Val Ala Val Arg
20 25 30

Glu Pro Lys Ile Glu Leu Ala Lys Glu Ala Ile Leu Lys Ile Asn Ala
35 40 45

Ala Met Pro Lys Met Ser Tyr Gln Gly Gly Leu Tyr Thr Phe Ala Pro
50 55 60

Tyr Ser Val Ile Ile Pro Gln Gly Ser Trp Asn Ser Cys Val Ala Glu
65 70 75 80

Cys Ala Val Asn Thr Ile Lys Ser Asp Leu Glu Ile Phe Gly Arg Leu
85 90 95

2000605SEQLIST.ST25

Thr Pro Val Gly Asp Gly Ile Lys Met His Glu Thr Val Ile Asn Gln
 100 105 110

Met Pro Pro Gln Ala Ala Val Ile Leu Leu Thr Asp Gly His Asn Asn
 115 120 125

Leu Gly Met Asn Pro Val Glu Glu Val Lys Ser Ile Tyr Gln Thr Asn
 130 135 140

Pro Asn Val Cys Phe His Val Val Ser Phe Ala Asp Asp Ala Glu Gly
 145 150 155 160

Lys Ala Ile Ile Asp Gln Ile Val Ala Leu Asn Ser Gly Ser Val Leu
 165 170 175

Val Asp Gly Leu Gln Leu Leu Gln Asn Pro Ala Val Cys Gln Glu Phe
 180 185 190

Val Asn Ser Val Phe Cys Gln Glu Gln Ile Leu Val Thr Glu Glu Val
 195 200 205

Val Val Leu Arg Gly Val Asn Phe Ala Phe
 210 215

<210> 3
 <211> 1428
 <212> DNA
 <213> *Lawsonia intracellularis*

<220>
 <221> CDS
 <222> (1)..(1425)

<400> 3
 gct att gat ttt aag gca aag ggg gtg tgg gac ttc aat ttt gag tgg 48
 Ala Ile Asp Phe Lys Ala Lys Gly Val Trp Asp Phe Asn Phe Glu Trp
 1 5 10 15

caa caa tct agt ttt atg aag ggc gat gga gat caa cgt ttt tcg cct 96
 Gln Gln Ser Ser Phe Met Lys Gly Asp Gly Asp Gln Arg Phe Ser Pro
 20 25 30

aaa caa cgt tta cgt act caa ata gac att gtt gca tca gag agt ctt 144
 Lys Gln Arg Leu Arg Thr Gln Ile Asp Ile Val Ala Ser Glu Ser Leu
 35 40 45

aag ggt gtt gta ttc ttt gaa tta ggt aag act atc tgg gga cgt ggt 192
 Lys Gly Val Val Phe Phe Glu Leu Gly Lys Thr Ile Trp Gly Arg Gly

2000605SEQLIST.ST25

50	55	60	
gtt gat ggt gct tct att gga aca gat ggt aaa aat gtt ata aag ctc			240
Val Asp Gly Ala Ser Ile Gly Thr Asp Gly Lys Asn Val Ile Lys Leu			
65	70	75	80
cgt tat tcc tat gtt gat tgg gtt att cct tac aca gat gtg caa gtc			288
Arg Tyr Ser Tyr Val Asp Trp Val Ile Pro Tyr Thr Asp Val Gln Val			
85	90	95	
cgt atg ggt tta caa cct tat gtc ctt cca gga ttt gtt gca ggt tct			336
Arg Met Gly Leu Gln Pro Tyr Val Leu Pro Gly Phe Val Ala Gly Ser			
100	105	110	
aca ata tta gat gct gat gga gca ggt gtt act gtt tct gct gta ttt			384
Thr Ile Leu Asp Ala Asp Gly Ala Gly Val Thr Val Ser Ala Val Phe			
115	120	125	
aat gat tat tta ggt gct aca gct ttc tgg atg cgt gca ttg cat aaa			432
Asn Asp Tyr Leu Gly Ala Thr Ala Phe Trp Met Arg Ala Leu His Lys			
130	135	140	
aac tat gat agt aat tat gga ata tca aag cta cct aac ttt aaa ggt			480
Asn Tyr Asp Ser Asn Tyr Gly Ile Ser Lys Leu Pro Asn Phe Lys Gly			
145	150	155	160
aca aca tta gat gta gtt gga tta act att cct gta aca ata tct gat			528
Thr Thr Leu Asp Val Val Gly Leu Thr Ile Pro Val Thr Ile Ser Asp			
165	170	175	
ata aaa att gct cca tgg ggt atg ttt gct ttt gca ggt aag aag agc			576
Ile Lys Ile Ala Pro Trp Gly Met Phe Ala Phe Ala Gly Lys Lys Ser			
180	185	190	
tta tta ggg gaa agc tat gga gat att gaa gat gta aga gca ggt ctt			624
Leu Leu Gly Glu Ser Tyr Gly Asp Ile Glu Asp Val Arg Ala Gly Leu			
195	200	205	
tta cca gca atg cca gca gga ttt gga tat agc tgg gga gct ggt aat			672
Leu Pro Ala Met Pro Ala Gly Phe Gly Tyr Ser Trp Gly Ala Gly Asn			
210	215	220	
cca ttt gga gat gtt ttt cca aat aaa aag cgt ggt aat gca tgg tgg			720
Pro Phe Gly Asp Val Phe Pro Asn Lys Lys Arg Gly Asn Ala Trp Trp			
225	230	235	240
gtt ggt tta tca gct gaa ctt gct ggc tca agt cct ttg cat ata gct			768
Val Gly Leu Ser Ala Glu Leu Ala Gly Ser Ser Pro Leu His Ile Ala			
245	250	255	
gtt gat ggt gct tat gga cga gca gac tta gga agt ctt aga aat gtt			816
Val Asp Gly Ala Tyr Gly Arg Ala Asp Leu Gly Ser Leu Arg Asn Val			
260	265	270	
gtt att ggt gac ttc tta cta gat aag att gat tta aaa cgt caa ggt			864
Val Ile Gly Asp Phe Leu Leu Asp Lys Ile Asp Leu Lys Arg Gln Gly			
275	280	285	

2000605SEQLIST.ST25

tgg tat gca gca tta tta gca gaa tat aaa ttt gaa tat gta act cca	912
Trp Tyr Ala Ala Leu Leu Ala Glu Tyr Lys Phe Glu Tyr Val Thr Pro	
290 295 300	
ggg gtt ata ggt tgg tat gcc tca gga gat aaa gtt gat tca cgt ggc	960
Gly Val Ile Gly Trp Tyr Ala Ser Gly Asp Lys Val Asp Ser Arg Gly	
305 310 315 320	
gcc tct aaa aga ata cca aca tta gtt gga aac tgg tca gca aca agt	1008
Ala Ser Lys Arg Ile Pro Thr Leu Val Gly Asn Trp Ser Ala Thr Ser	
325 330 335	
ttt gga tat agt gga gcc tat ggt ata ggc aaa gat tct gtt ttt gga	1056
Phe Gly Tyr Ser Gly Ala Tyr Gly Ile Gly Lys Asp Ser Val Phe Gly	
340 345 350	
aat act att gct ggc tca tgg ggt gtt gta gtt cag ttg aaa gat att	1104
Asn Thr Ile Ala Gly Ser Trp Gly Val Val Val Gln Leu Lys Asp Ile	
355 360 365	
tct ttc tta gaa aat cta act cat gtt atc cgt gga gct aga att cag	1152
Ser Phe Leu Glu Asn Leu Thr His Val Ile Arg Gly Ala Arg Ile Gln	
370 375 380	
ggt aca aat aat aaa gac gtt cct gaa cac tta ggt tta tca tac gtt	1200
Gly Thr Asn Asn Lys Asp Val Pro Glu His Leu Gly Leu Ser Tyr Val	
385 390 395 400	
act acc att tat gac aca cgt ggt ggt gat aat atg ctt tac tta aca	1248
Thr Thr Ile Tyr Asp Thr Arg Gly Gly Asp Asn Met Leu Tyr Leu Thr	
405 410 415	
aag aaa gat tat gct tgg gaa gta gat ttt gat act gaa tat aaa atc	1296
Lys Lys Asp Tyr Ala Trp Glu Val Asp Phe Asp Thr Glu Tyr Lys Ile	
420 425 430	
tat aaa gac tta agt gta gct ctt gaa ctg tca tat att cgt ctt gaa	1344
Tyr Lys Asp Leu Ser Val Ala Leu Glu Leu Ser Tyr Ile Arg Leu Glu	
435 440 445	
ctt gat aaa aaa cta tgg aac ctt caa aga gaa gtt gat aag aat gcc	1392
Leu Asp Lys Lys Leu Trp Asn Leu Gln Arg Glu Val Asp Lys Asn Ala	
450 455 460	
tat cgt gct ggt tta aat atg aag tat caa ttc taa	1428
Tyr Arg Ala Gly Leu Asn Met Lys Tyr Gln Phe	
465 470 475	

<210> 4
 <211> 475
 <212> PRT
 <213> Lawsonia intracellularis

<400> 4

2000605SEQLIST.ST25

Ala Ile Asp Phe Lys Ala Lys Gly Val Trp Asp Phe Asn Phe Glu Trp
1 5 10 15

Gln Gln Ser Ser Phe Met Lys Gly Asp Gly Asp Gln Arg Phe Ser Pro
20 25 30

Lys Gln Arg Leu Arg Thr Gln Ile Asp Ile Val Ala Ser Glu Ser Leu
35 40 45

Lys Gly Val Val Phe Phe Glu Leu Gly Lys Thr Ile Trp Gly Arg Gly
50 55 60

Val Asp Gly Ala Ser Ile Gly Thr Asp Gly Lys Asn Val Ile Lys Leu
65 70 75 80

Arg Tyr Ser Tyr Val Asp Trp Val Ile Pro Tyr Thr Asp Val Gln Val
85 90 95

Arg Met Gly Leu Gln Pro Tyr Val Leu Pro Gly Phe Val Ala Gly Ser
100 105 110

Thr Ile Leu Asp Ala Asp Gly Ala Gly Val Thr Val Ser Ala Val Phe
115 120 125

Asn Asp Tyr Leu Gly Ala Thr Ala Phe Trp Met Arg Ala Leu His Lys
130 135 140

Asn Tyr Asp Ser Asn Tyr Gly Ile Ser Lys Leu Pro Asn Phe Lys Gly
145 150 155 160

Thr Thr Leu Asp Val Val Gly Leu Thr Ile Pro Val Thr Ile Ser Asp
165 170 175

Ile Lys Ile Ala Pro Trp Gly Met Phe Ala Phe Ala Gly Lys Lys Ser
180 185 190

Leu Leu Gly Glu Ser Tyr Gly Asp Ile Glu Asp Val Arg Ala Gly Leu
195 200 205

Leu Pro Ala Met Pro Ala Gly Phe Gly Tyr Ser Trp Gly Ala Gly Asn
210 215 220

Pro Phe Gly Asp Val Phe Pro Asn Lys Lys Arg Gly Asn Ala Trp Trp

2000605SEQLIST.ST25

225 230 235 240

Val Gly Leu Ser Ala Glu Leu Ala Gly Ser Ser Pro Leu His Ile Ala
245 250 255Val Asp Gly Ala Tyr Gly Arg Ala Asp Leu Gly Ser Leu Arg Asn Val
260 265 270Val Ile Gly Asp Phe Leu Leu Asp Lys Ile Asp Leu Lys Arg Gln Gly
275 280 285Trp Tyr Ala Ala Leu Leu Ala Glu Tyr Lys Phe Glu Tyr Val Thr Pro
290 295 300Gly Val Ile Gly Trp Tyr Ala Ser Gly Asp Lys Val Asp Ser Arg Gly
305 310 315 320Ala Ser Lys Arg Ile Pro Thr Leu Val Gly Asn Trp Ser Ala Thr Ser
325 330 335Phe Gly Tyr Ser Gly Ala Tyr Gly Ile Gly Lys Asp Ser Val Phe Gly
340 345 350Asn Thr Ile Ala Gly Ser Trp Gly Val Val Val Gln Leu Lys Asp Ile
355 360 365Ser Phe Leu Glu Asn Leu Thr His Val Ile Arg Gly Ala Arg Ile Gln
370 375 380Gly Thr Asn Asn Lys Asp Val Pro Glu His Leu Gly Leu Ser Tyr Val
385 390 395 400Thr Thr Ile Tyr Asp Thr Arg Gly Gly Asp Asn Met Leu Tyr Leu Thr
405 410 415Lys Lys Asp Tyr Ala Trp Glu Val Asp Phe Asp Thr Glu Tyr Lys Ile
420 425 430Tyr Lys Asp Leu Ser Val Ala Leu Glu Leu Ser Tyr Ile Arg Leu Glu
435 440 445Leu Asp Lys Lys Leu Trp Asn Leu Gln Arg Glu Val Asp Lys Asn Ala
450 455 460

2000605SEQLIST.ST25

Tyr Arg Ala Gly Leu Asn Met Lys Tyr Gln Phe
465 470 475

<210> 5
<211> 12
<212> PRT
<213> Lawsonia intracellularis

<400> 5

Ala Ala Tyr Glu Tyr Leu Val Met Leu Gly Val Asn
1 5 10

<210> 6
<211> 12
<212> PRT
<213> Lawsonia intracellularis

<400> 6

Gly Thr Gln Glu Tyr Asn Leu Ala Leu Gly Glu Arg
1 5 10

<210> 7
<211> 11
<212> PRT
<213> Lawsonia intracellularis

<400> 7

Pro Phe Tyr Val Met Val Trp Thr Pro Arg Arg
1 5 10

<210> 8
<211> 20
<212> DNA
<213> Lawsonia intracellularis

<400> 8

tatagctgtt gatggtgctt

20

<210> 9
<211> 19
<212> DNA
<213> Lawsonia intracellularis

<400> 9

ggtgataata tgctttact

19

2000605SEQLIST.ST25

<210> 10
<211> 19
<212> DNA
<213> *Lawsonia intracellularis*

<400> 10
atatgggggg gggggggggg 19

<210> 11
<211> 31
<212> DNA
<213> *Lawsonia intracellularis*

<400> 11
ggaattccat atgtattgtat tttaaggcaa a 31

<210> 12
<211> 30
<212> DNA
<213> *Lawsonia intracellularis*

<400> 12
cgcggatccg cgatccttga taattcaagg 30

<210> 13
<211> 36
<212> DNA
<213> *Lawsonia intracellularis*

<400> 13
ggaattccat atgaaaatga aaaagagcac tctggc 36

<210> 14
<211> 30
<212> DNA
<213> *Lawsonia intracellularis*

<400> 14
ccgctcgagg aattgatact tcataattaa 30

<210> 15
<211> 12
<212> PRT
<213> *Lawsonia intracellularis*

<400> 15

Ala Glu Val Thr Ala Ser Cys Thr Lys Arg Val Gly
1 5 10

<210> 16

2000605SEQLIST.ST25

<211> 16

<212> PRT

<213> *Lawsonia intracellularis*

<400> 16

Gly Val Asn Phe Ala Phe Asp Ser Phe Ala Leu Asp Asp Thr Ala Lys
1 5 10 15

<210> 17

<211> 12

<212> PRT

<213> *Lawsonia intracellularis*

<400> 17

Ile Asp Phe Lys Ala Lys Gly Val Trp Asp Phe Asn
1 5 10

<210> 18

<211> 11

<212> PRT

<213> *Lawsonia intracellularis*

<400> 18

Lys Asp Tyr Ala Trp Glu Val Asp Phe Asp Thr
1 5 10

<210> 19

<211> 12

<212> PRT

<213> *Lawsonia intracellularis*

<400> 19

Ala Ala Tyr Glu Tyr Leu Val Met Leu Gly Val Asn
1 5 10

<210> 20

<211> 12

<212> PRT

<213> *Lawsonia intracellularis*

<400> 20

Gly Thr Gln Glu Tyr Asn Leu Ala Leu Gly Glu Arg
1 5 10

<210> 21

<211> 20

<212> DNA

2000605SEQLIST.ST25

<213> Primer

<220>
<221> misc_feature
<222> (3)..(3)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (6)..(6)
<223> n is a, c, g, or t

<400> 21
ggnacncarg artayaaytt

20

<210> 22
<211> 20
<212> DNA
<213> Primer

<220>
<221> misc_feature
<222> (3)..(3)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (6)..(6)
<223> n is a, c, g, or t

<400> 22
ggnacncarg artayaayct

20

<210> 23
<211> 20
<212> DNA
<213> Primer

<220>
<221> misc_feature
<222> (15)..(15)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (18)..(18)
<223> n is a, c, g, or t

<400> 23
aarttrtayt cytgnngtncc

20

2000605SEQLIST.ST25

<210> 24
<211> 20
<212> DNA
<213> Primer

<220>
<221> misc_feature
<222> (15)..(15)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (18)..(18)
<223> n is a, c, g, or t

<400> 24
aarttrtayt cytgnngtncc

20

<210> 25
<211> 21
<212> DNA
<213> Primer

<220>
<221> misc_feature
<222> (3)..(3)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (18)..(18)
<223> n is a, c, g, or t

<400> 25
gcntaygayt aytrgtnat g

21

<210> 26
<211> 21
<212> DNA
<213> Primer

<220>
<221> misc_feature
<222> (3)..(3)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (15)..(15)
<223> n is a, c, g, or t

<220>

2000605SEQLIST.ST25

<221> misc_feature
<222> (18)..(18)
<223> n is a, c, g, or t

<400> 26
gcntaygayt ayctngtnat g

21

<210> 27
<211> 21
<212> DNA
<213> Primer

<220>
<221> misc_feature
<222> (4)..(4)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (19)..(19)
<223> n is a, c, g, or t

<400> 27
catnacyaar tartcrtang c

21

<210> 28
<211> 21
<212> DNA
<213> Primer

<220>
<221> misc_feature
<222> (4)..(4)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (7)..(7)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (19)..(19)
<223> n is a, c, g, or t

<400> 28
catnacnagr tartcrtang c

21

<210> 29
<211> 20
<212> DNA
<213> Primer

2000605SEQLIST.ST25

<220>
<221> misc_feature
<222> (9)..(9)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (15)..(15)
<223> n is a, c, g, or t

<400> 29
ttytaygtta tggtnntggac

20

<210> 30
<211> 20
<212> DNA
<213> Primer

<220>
<221> misc_feature
<222> (6)..(6)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (12)..(12)
<223> n is a, c, g, or t

<400> 30
gtccanacca tnacrtaraa

20

<210> 31
<211> 7
<212> PRT
<213> Lawsonia intracellularis

<400> 31

Pro Phe Tyr Val Met Val Trp
1 5

<210> 32
<211> 8
<212> PRT
<213> Lawsonia intracellularis

<400> 32

Ser Asp Leu Glu Ile Phe Gly Arg
1 5